

Claims

What is claimed is:

1. An end plate for an electrochemical cell stack, the end plate comprising an inner face, two end faces, a top face and a bottom face; and at least one cavity for reducing the weight of the end plate, the at least one cavity being on at least one of the inner face, the two end faces, the top face and the bottom face, wherein the at least one cavity comprises at least fifteen percent of the volume of the end plate.
2. The end plate of claim 1, wherein the at least one cavity comprises at least ten holes.
3. The end plate of claim 1, wherein the inner face includes some or all of the at least one cavity.
4. The end plate of claim 3, wherein the inner face includes a central region and a peripheral region surrounding the central region, the at least one cavity being provided in the central region.
5. The end plate of claim 3, wherein the at least one cavity includes a plurality of blind holes, which plurality form an array of m rows and n columns of blind holes, where m and n are integers greater than one.
6. The end plate of claim 5, where m is greater than five and n is greater than ten.
7. The end plate of claim 3, wherein the inner face includes a central region and a peripheral region surrounding the central region, and the at least one cavity includes a plurality of blind holes, a first portion of the plurality of blind holes being provided in the peripheral region.
8. The end plate of claim 7, wherein a second portion of the plurality of blind holes are provided in the central region.

9. The end plate of claim 8, wherein the shape of the blind holes of the first portion are disparate from the shape of the blind holes of the second portion.
10. The end plate of claim 1, wherein each of the at least cavity is a blind hole with a depth of at least 40% of the thickness of the end plate.
11. The end plate of claim 10, wherein each of the at least one blind hole has a depth of at least 60% of the thickness of the end plate.
12. The end plate of claim 1, wherein each of the at least one cavity is a blind hole having substantially the same depth.
13. The end plate of claim 1, wherein each of the at least one cavity is round.
14. The end plate of claim 1, wherein each of the at least one cavity has a width of at least one-sixth the size of the lateral length of the end plate.
15. An end plate for an electrochemical stack, the end plate comprising an inner face, two end faces, a top face and a bottom face; and at least one cavity for reducing the weight of the end plate, the at least one cavity being on at least one of the inner face, the two end faces, the top face and the bottom face, wherein the at least one cavity is air-filled but otherwise empty when the electrochemical stack is in operation.
16. The end plate of claim 15, wherein the at least one cavity includes a through hole.
17. The end plate of claim 16, wherein the inner face has a central region and a peripheral region surrounding the central region, the through hole being provided in the central region.

18. The end plate of claim 15, wherein the at least one cavity includes a plurality of through holes, which plurality form an array of m rows and n columns of through holes, m and n being integers greater than one.
19. The end plate of claim 18, where m is greater than five and n is greater than ten.
20. The end plate of claim 15, wherein the end plate includes an inner face having a central region and a peripheral region surrounding the central region, and the at least one cavity includes a plurality of through holes, a first portion of the plurality of through holes being provided in the peripheral region.
21. The end plate of claim 20, wherein a second portion of the plurality of through holes are provided in the central region.
22. The end plate of claim 15, wherein the at least one cavity is a cylindrical through hole.
23. An end assembly for an electrochemical cell stack, the end assembly comprising at least two of
- an end plate for attaching at least one connection port thereto for transmitting a fluid;
 - a terminal plate for connecting electrical leads thereto to draw current;
 - and
 - an insulator plate for insulating, wherein the at least two are secured together with a securing agent.
24. The end assembly of claim 23, wherein the end assembly includes the terminal plate, the insulator plate and the end plate, and wherein the end plate has an inner face with at least one hole, the insulator plate has a corresponding at least one through hole, and the terminal plate has an outer

face with a corresponding at least one hole, said holes used to secure together the terminal plate, the insulator plate and the end plate.

25. The system of claim 24, wherein the securing agent includes at least one bolt passing through the at least one through hole and engaging the at least one hole of the end plate and the terminal plate.

26. The system of claim 25, wherein the at least one hole in the end plate is a threaded blind hole, the at least one bolt engaging therewith.

27. The system of claim 25, wherein the at least one hole in the terminal plate is a threaded blind hole, the at least one bolt engaging therewith.

28. The system of claim 25, wherein the at least one hole in the end plate is a through hole, the at least one bolt passing therethrough and screwed on to at least one nut.

29. The system of claim 25, wherein the at least one hole in the terminal plate is a through hole, the at least one bolt passing therethrough and screwed on to at least one nut.

30. The system of claim 23, wherein the securing agent is one of a bolt, a screw, a snap, glue, heat solder and weld.

31. An end plate for an electrochemical cell stack, the end plate comprising an inner face and an outer face each having a central region and a peripheral region;

a thickness measured along a stacking direction perpendicular to the central regions;

a left end face and a right end face; and

a height measured along a lateral direction that is perpendicular to the stacking direction and parallel to the left and right end faces,

wherein the end plate tapers to reduce weight such that at least one of the following two conditions holds,

- i) the thickness of the end plate is smaller near the peripheral regions proximate to the end faces than near the central regions, and
- ii) the height of the end plate is smaller near the peripheral regions proximate to the end faces than near the central regions.

32. The end plate of claim 31, wherein the inner face is planar and the outer face is non-planar.

33. An end plate for an electrochemical cell stack, the end plate comprising an inner face;
an end face substantially perpendicular to the inner face;
an end face opening on the end face; and
an inner face opening on the inner face, the end face opening and the inner face opening being in fluid communication for the flow of a fluid.

34. An end plate for an electrochemical cell stack, the end plate comprising an outer face;
an outer connection port on the outer face for allowing a fluid to pass therethrough;
an inner face;
an inner connection port on the inner face that corresponds to the outer connection port, wherein the outer connection port has a counter bore with an enlarged diameter and an inner bore with a reduced diameter for securing an external line for the fluid, the inner bore being in fluid communication with the inner connection port.

35. The end plate of claim 34, wherein a face of the counter bore includes at least one threaded hole for securing the external line for the fluid.